

SEQUENCE LISTING

<110> MUTABILIS S.A.
 <120> Pathogenicity determinants which can be used as targets for developing means for preventing and controlling bacterial infections and/or systemic dissemination

<130> 1621

<140> 10/520,820

<141> 2005-04-28

<150> PCT/EP2003/008209

<151> 2003-07-09

<150> FR 0208636

<151> 2002-07-09

<160> 32

<170> PatentIn version 3.1

<210> 1

<211> 305

<212> PRT

<213> Escherichia coli

<400> 1

Pro Ala Leu Thr Asp Ala Gln Gln Ala Ile Pro Gly Ile Lys Phe Asp
 1 5 10 15

Trp Val Val Glu Glu Gly Phe Ala Gln Ile Pro Ser Trp His Ala Ala
 20 25 30

Val Glu Arg Val Ile Pro Val Ala Ile Arg Arg Trp Arg Lys Ala Trp
 35 40 45

Phe Ser Ala Pro Ile Lys Ala Glu Arg Lys Ala Phe Arg Glu Ala Leu
 50 55 60

Gln Ala Glu Asn Tyr Asp Ala Val Ile Asp Ala Gln Gly Leu Val Lys
 65 70 75 80

Ser Ala Ala Leu Val Thr Arg Leu Ala His Gly Val Lys His Gly Leu
 85 90 95

Asp Trp Gln Thr Ala Arg Glu Pro Leu Ala Ser Leu Phe Tyr Asn Cys
 100 105 110

Lys His His Ile Ala Lys Gln Gln His Ala Val Glu Arg Thr Arg Glu
115 120 125

Leu Phe Ala Lys Ser Leu Gly Tyr Ser Lys Pro Gln Thr Gln Gly Asp
130 135 140

Tyr Ala Ile Ala Gln His Phe Leu Thr Asn Leu Pro Thr Asp Ala Gly
145 150 155 160

Glu Tyr Ala Val Phe Leu His Ala Thr Thr Arg Asp Asp Lys His Trp
165 170 175

Pro Glu Glu His Trp Arg Glu Leu Ile Gly Leu Leu Ala Asp Ser Gly
180 185 190

Ile Arg Ile Lys Leu Pro Trp Gly Ala Pro His Glu Glu Glu Arg Ala
195 200 205

Lys Arg Leu Ala Glu Gly Phe Ala Tyr Val Glu Val Leu Pro Lys Met
210 215 220

Ser Leu Glu Gly Val Ala Arg Val Leu Ala Gly Ala Lys Phe Val Val
225 230 235 240

Ser Val Asp Thr Gly Leu Ser His Leu Thr Ala Ala Leu Asp Arg Pro
245 250 255

Asn Ile Thr Val Tyr Gly Pro Thr Asp Pro Gly Leu Ile Gly Gly Tyr
260 265 270

Gly Lys Asn Gln Met Val Cys Arg Ala Pro Gly Asn Glu Leu Ser Gln
275 280 285

Leu Thr Ala Asn Ala Val Lys Arg Phe Ile Glu Glu Asn Ala Ala Met
290 295 300

Ile
305

<210> 2
<211> 340
<212> PRT
<213> Escherichia coli

<400> 2

Met Arg Phe His Gly Asp Met Leu Leu Thr Thr Pro Val Ile Ser Ser
1 5 10 15

Leu Lys Lys Asn Tyr Pro Asp Ala Lys Ile Asp Val Leu Leu Tyr Gln
20 25 30

Asp Thr Ile Pro Ile Leu Ser Glu Asn Pro Glu Ile Asn Ala Leu Tyr
35 40 45

Gly Ile Lys Asn Lys Lys Ala Lys Ala Ser Glu Lys Ile Ala Asn Phe
50 55 60

Phe His Leu Ile Lys Val Leu Arg Ala Asn Lys Tyr Asp Leu Ile Val
65 70 75 80

Asn Leu Thr Asp Gln Trp Met Val Ala Ile Leu Val Arg Leu Leu Asn
85 90 95

Ala Arg Val Lys Ile Ser Gln Asp Tyr His His Arg Gln Ser Ala Phe
100 105 110

Trp Arg Lys Ser Phe Thr His Leu Val Pro Leu Gln Gly Gly Asn Val
115 120 125

Val Glu Ser Asn Leu Ser Val Leu Thr Pro Leu Gly Val Asp Ser Leu
130 135 140

Val Lys Gln Thr Thr Met Ser Tyr Pro Pro Ala Ser Trp Lys Arg Met
145 150 155 160

Arg Arg Glu Leu Asp His Ala Gly Val Gly Gln Asn Tyr Val Val Ile
165 170 175

Gln Pro Thr Ala Arg Gln Ile Phe Lys Cys Trp Asp Asn Ala Lys Phe
180 185 190

Ser Ala Val Ile Asp Ala Leu His Ala Arg Gly Tyr Glu Val Val Leu
195 200 205

Thr Ser Gly Pro Asp Lys Asp Asp Leu Ala Cys Val Asn Glu Ile Ala
210 215 220

Gln Gly Cys Gln Thr Pro Pro Val Thr Ala Leu Ala Gly Lys Val Thr
225 230 235 240

Phe Pro Glu Leu Gly Ala Leu Ile Asp His Ala Gln Leu Phe Ile Gly
245 250 255

Val Asp Ser Ala Pro Ala His Ile Ala Ala Ala Val Asn Thr Pro Leu
260 265 270

Ile Ser Leu Phe Gly Ala Thr Asp His Ile Phe Trp Arg Pro Trp Ser
275 280 285

Asn Asn Met Ile Gln Phe Trp Ala Gly Asp Tyr Arg Glu Met Pro Thr
290 295 300

Arg Asp Gln Arg Asp Arg Asn Glu Met Tyr Leu Ser Val Ile Pro Ala
305 310 315 320

Ala Asp Val Ile Ala Ala Val Asp Lys Leu Leu Pro Ser Ser Thr Thr
325 330 335

Gly Thr Ser Leu
340

<210> 3
<211> 265
<212> PRT
<213> Escherichia coli

<400> 3

Met Val Glu Leu Lys Glu Pro Phe Ala Thr Leu Trp Arg Gly Lys Asp
1 5 10 15

Pro Phe Glu Glu Val Lys Thr Leu Gln Gly Glu Val Phe Arg Glu Leu
20 25 30

Glu Thr Arg Arg Thr Leu Arg Phe Glu Met Ala Gly Lys Ser Tyr Phe
35 40 45

Leu Lys Trp His Arg Gly Thr Thr Leu Lys Glu Ile Ile Lys Asn Leu
50 55 60

Leu Ser Leu Arg Met Pro Val Leu Gly Ala Asp Arg Glu Trp Asn Ala
65 70 75 80

Ile His Arg Leu Arg Asp Val Gly Val Asp Thr Met Tyr Gly Val Ala
85 90 95

Phe Gly Glu Lys Gly Met Asn Pro Leu Thr Arg Thr Ser Phe Ile Ile
100 105 110

Thr Glu Asp Leu Thr Pro Thr Ile Ser Leu Glu Asp Tyr Cys Ala Asp
115 120 125

Trp Ala Thr Asn Pro Pro Asp Val Arg Val Lys Arg Met Leu Ile Lys
130 135 140

Arg Val Ala Thr Met Val Arg Asp Met His Ala Ala Gly Ile Asn His
145 150 155 160

Arg Asp Cys Tyr Ile Cys His Phe Leu Leu His Leu Pro Phe Ser Gly
165 170 175

Lys Glu Glu Glu Leu Lys Ile Ser Val Ile Asp Leu His Arg Ala Gln
180 185 190

Leu Arg Thr Arg Val Pro Arg Arg Trp Arg Asp Lys Asp Leu Ile Gly
195 200 205

Leu Tyr Phe Ser Ser Met Asn Ile Gly Leu Thr Gln Arg Asp Ile Trp
210 215 220

Arg Phe Met Lys Val Tyr Phe Ala Ala Pro Leu Lys Asp Ile Leu Lys
225 230 235 240

Gln Glu Gln Gly Leu Leu Ser Gln Ala Glu Ala Lys Ala Thr Lys Ile
245 250 255

Arg Glu Arg Thr Ile Arg Lys Ser Leu
260 265

<210> 4
<211> 374

<212> PRT

<213> Escherichia coli

<400> 4

Met Ile Val Ala Phe Cys Leu Tyr Lys Tyr Phe Pro Phe Gly Gly Leu
1 5 10 15

Gln Arg Asp Phe Met Arg Ile Ala Gln Thr Val Ala Ala Arg Gly His
20 25 30

His Val Arg Val Tyr Thr Gln Ser Trp Glu Gly Glu Cys Pro Asp Val
35 40 45

Phe Glu Leu Ile Lys Val Pro Val Lys Ser His Thr Asn His Gly Arg
50 55 60

Asn Ala Glu Tyr Phe Ala Trp Val Gln Lys His Leu Arg Glu His Pro
65 70 75 80

Val Asp Lys Val Val Gly Phe Asn Lys Met Pro Gly Leu Asp Val Tyr
85 90 95

Tyr Ala Ala Asp Val Cys Tyr Ala Glu Lys Val Ala Gln Glu Lys Gly
100 105 110

Phe Phe Tyr Arg Leu Thr Ser Arg Tyr Arg His Tyr Ala Ala Phe Glu
115 120 125

Arg Ala Thr Phe Glu Gln Gly Lys Pro Thr Gln Leu Leu Met Leu Thr
130 135 140

Asp Lys Gln Ile Ala Asp Phe Gln Lys His Tyr Gln Thr Glu Ala Glu
145 150 155 160

Arg Phe His Ile Leu Pro Pro Gly Ile Tyr Pro Asp Arg Lys Tyr Ser
165 170 175

Gln Gln Pro Ala Asn Ser Arg Glu Ile Phe Arg Lys Lys Asn Gly Ile
180 185 190

Thr Glu Gln Gln Tyr Leu Leu Leu Gln Val Gly Ser Asp Phe Thr Arg
195 200 205

Lys Gly Val Asp Arg Ser Ile Glu Ala Leu Ala Ser Leu Pro Asp Ser
210 215 220

Leu Arg His Asn Thr Leu Leu Tyr Val Val Gly Gln Asp Lys Pro Arg
225 230 235 240

Lys Phe Glu Ala Leu Ala Glu Lys Arg Gly Val Arg Ser Asn Val His
245 250 255

Phe Phe Ser Gly Arg Asn Asp Val Ser Glu Leu Met Ala Ala Ala Asp
260 265 270

Leu Leu Leu His Pro Ala Tyr Gln Glu Ala Ala Gly Ile Val Leu Leu
275 280 285

Glu Ala Ile Thr Ala Gly Leu Pro Val Leu Thr Thr Ala Val Cys Gly
290 295 300

Tyr Ala His Tyr Ile Val Asp Ala Asn Cys Gly Glu Ala Ile Ala Glu
305 310 315 320

Pro Phe Arg Gln Glu Thr Leu Asn Glu Ile Leu Arg Lys Ala Leu Thr
325 330 335

Gln Ser Ser Leu Arg Gln Ala Trp Ala Glu Asn Ala Arg His Tyr Ala
340 345 350

Asp Thr Gln Asp Leu Tyr Ser Leu Pro Glu Lys Ala Ala Asp Ile Ile
355 360 365

Thr Gly Gly Leu Asp Gly
370

<210> 5
<211> 348
<212> PRT
<213> Escherichia coli

<400> 5

Met Lys Ile Leu Val Ile Gly Pro Ser Trp Val Gly Asp Met Met Met
1 5 10 15

Ser Gln Ser Leu Tyr Arg Thr Leu Gln Ala Arg Tyr Pro Gln Ala Ile

20

25

30

Ile Asp Val Met Ala Pro Ala Trp Cys Arg Pro Leu Leu Ser Arg Met
 35 40 45

Pro Glu Val Asn Glu Ala Ile Pro Met Pro Leu Gly His Gly Ala Leu
 50 55 60

Glu Ile Gly Glu Arg Arg Lys Leu Gly His Ser Leu Arg Glu Lys Arg
 65 70 75 80

Tyr Asp Arg Ala Tyr Val Leu Pro Asn Ser Phe Lys Ser Ala Leu Val
 85 90 95

Pro Phe Phe Ala Gly Ile Pro His Arg Thr Gly Trp Arg Gly Glu Met
 100 105 110

Arg Tyr Gly Leu Leu Asn Asp Val Arg Val Leu Asp Lys Glu Ala Trp
 115 120 125

Pro Leu Met Val Glu Arg Tyr Ile Ala Leu Ala Tyr Asp Lys Gly Ile
 130 135 140

Met Arg Thr Ala Gln Asp Leu Pro Gln Pro Leu Leu Trp Pro Gln Leu
 145 150 155 160

Gln Val Ser Glu Gly Glu Lys Ser Tyr Thr Cys Asn Gln Phe Ser Leu
 165 170 175

Ser Ser Glu Arg Pro Met Ile Gly Phe Cys Pro Gly Ala Glu Phe Gly
 180 185 190

Pro Ala Lys Arg Trp Pro His Tyr His Tyr Ala Glu Leu Ala Lys Gln
 195 200 205

Leu Ile Asp Glu Gly Tyr Gln Val Val Leu Phe Gly Ser Ala Lys Asp
 210 215 220

His Glu Ala Gly Asn Glu Ile Leu Ala Ala Leu Asn Thr Glu Gln Gln
 225 230 235 240

Ala Trp Cys Arg Asn Leu Ala Gly Glu Thr Gln Leu Asp Gln Ala Val

245

250

255

Ile Leu Ile Ala Ala Cys Lys Ala Ile Val Thr Asn Asp Ser Gly Leu
 260 265 270

Met His Val Ala Ala Ala Leu Asn Arg Pro Leu Val Ala Leu Tyr Gly
 275 280 285

Pro Ser Ser Pro Asp Phe Thr Pro Pro Leu Ser His Lys Ala Arg Val
 290 295 300

Ile Arg Leu Ile Thr Gly Tyr His Lys Val Arg Lys Gly Asp Ala Ala
 305 310 315 320

Glu Gly Tyr His Gln Ser Leu Ile Asp Ile Thr Pro Gln Arg Val Leu
 325 330 335

Glu Glu Leu Asn Ala Leu Leu Leu Gln Glu Glu Ala
 340 345

<210> 6
 <211> 338
 <212> PRT
 <213> Escherichia coli

<400> 6

Met Ser Ala His Tyr Phe Asn Pro Gln Glu Met Ile Asn Lys Thr Ile
 1 5 10 15

Ile Phe Asp Glu Arg Pro Ala Ala Ser Val Ala Ser Ser Phe His Val
 20 25 30

Ala Tyr Gly Ile Asp Lys Asn Phe Leu Phe Gly Cys Gly Val Ser Ile
 35 40 45

Thr Ser Val Leu Leu His Asn Asn Asp Val Ser Phe Val Phe His Val
 50 55 60

Phe Ile Asp Asp Ile Pro Glu Ala Asp Ile Gln Arg Leu Ala Gln Leu
 65 70 75 80

Ala Lys Ser Tyr Arg Thr Cys Ile Gln Ile His Leu Val Asn Cys Glu
 85 90 95

Arg Leu Lys Ala Leu Pro Thr Thr Lys Asn Trp Ser Ile Ala Met Tyr
100 105 110

Phe Arg Phe Val Ile Ala Asp Tyr Phe Ile Asp Gln Gln Asp Lys Ile
115 120 125

Leu Tyr Leu Asp Ala Asp Ile Ala Cys Gln Gly Asn Leu Lys Pro Leu
130 135 140

Ile Thr Met Asp Leu Ala Asn Asn Val Ala Ala Val Val Thr Glu Arg
145 150 155 160

Asp Ala Asn Trp Trp Ser Leu Arg Gly Gln Ser Leu Gln Cys Asn Glu
165 170 175

Leu Glu Lys Gly Tyr Phe Asn Ser Gly Val Leu Leu Ile Asn Thr Leu
180 185 190

Ala Trp Ala Gln Glu Ser Val Ser Ala Lys Ala Met Ser Met Leu Ala
195 200 205

Asp Lys Ala Ile Val Ser Arg Leu Thr Tyr Met Asp Gln Asp Ile Leu
210 215 220

Asn Leu Ile Leu Leu Gly Lys Val Lys Phe Ile Asp Ala Lys Tyr Asn
225 230 235 240

Thr Gln Phe Ser Leu Asn Tyr Glu Leu Lys Lys Ser Phe Val Cys Pro
245 250 255

Ile Asn Asp Glu Thr Val Leu Ile His Tyr Val Gly Pro Thr Lys Pro
260 265 270

Trp His Tyr Trp Ala Gly Tyr Pro Ser Ala Gln Pro Phe Ile Lys Ala
275 280 285

Lys Glu Ala Ser Pro Trp Lys Asn Glu Pro Leu Met Arg Pro Val Asn
290 295 300

Ser Asn Tyr Ala Arg Tyr Cys Ala Lys His Asn Phe Lys Gln Asn Lys
305 310 315 320

Pro Ile Asn Gly Ile Met Asn Tyr Ile Tyr Tyr Phe Tyr Leu Lys Ile
325 330 335

Ile Lys

<210> 7
<211> 302
<212> PRT
<213> Escherichia coli

<400> 7

Met Ala Ala Ile Asn Thr Lys Val Lys Lys Ala Val Ile Pro Val Ala
1 5 10 15

Gly Leu Gly Thr Arg Met Leu Pro Ala Thr Lys Ala Ile Pro Lys Glu
20 25 30

Met Leu Pro Leu Val Asp Lys Pro Leu Ile Gln Tyr Val Val Asn Glu
35 40 45

Cys Ile Ala Ala Gly Ile Thr Glu Ile Val Leu Val Thr His Ser Ser
50 55 60

Lys Asn Ser Ile Glu Asn His Phe Asp Thr Ser Phe Glu Leu Glu Ala
65 70 75 80

Met Leu Glu Lys Arg Val Lys Arg Gln Leu Leu Asp Glu Val Gln Ser
85 90 95

Ile Cys Pro Pro His Val Thr Ile Met Gln Val Arg Gln Gly Leu Ala
100 105 110

Lys Gly Leu Gly His Ala Val Leu Cys Ala His Pro Val Val Gly Asp
115 120 125

Glu Pro Val Ala Val Ile Leu Pro Asp Val Ile Leu Asp Glu Tyr Glu
130 135 140

Ser Asp Leu Ser Gln Asp Asn Leu Ala Glu Met Ile Arg Arg Phe Asp
145 150 155 160

Glu Thr Gly His Ser Gln Ile Met Val Glu Pro Val Ala Asp Val Thr

	165		170		175
Ala Tyr Gly Val Val Asp Cys Lys Gly Val Glu Leu Ala Pro Gly Glu	180	185	190		
Ser Val Pro Met Val Gly Val Val Glu Lys Pro Lys Ala Asp Val Ala	195	200	205		
Pro Ser Asn Leu Ala Ile Val Gly Arg Tyr Val Leu Ser Ala Asp Ile	210	215	220		
Trp Pro Leu Leu Ala Lys Thr Pro Pro Gly Ala Gly Asp Glu Ile Gln	225	230	235	240	
Leu Thr Asp Ala Ile Asp Met Leu Ile Glu Lys Glu Thr Val Glu Ala	245	250	255		
Tyr His Met Lys Gly Lys Ser His Asp Cys Gly Asn Lys Leu Gly Tyr	260	265	270		
Met Gln Ala Phe Val Glu Tyr Gly Ile Arg His Asn Thr Leu Gly Thr	275	280	285		
Glu Phe Lys Ala Trp Leu Glu Glu Glu Met Gly Ile Lys Lys	290	295	300		
<210> 8					
<211> 546					
<212> PRT					
<213> Escherichia coli					
<400> 8					
Met Ala Ile His Asn Arg Ala Gly Gln Pro Ala Gln Gln Ser Asp Leu	1	5	10	15	
Ile Asn Val Ala Gln Leu Thr Ala Gln Tyr Tyr Val Leu Lys Pro Glu	20	25	30		
Ala Gly Asn Ala Glu His Ala Val Lys Phe Gly Thr Ser Gly His Arg	35	40	45		
Gly Ser Ala Ala Arg His Ser Phe Asn Glu Pro His Ile Leu Ala Ile	50	55	60		

Ala Gln Ala Ile Ala Glu Glu Arg Ala Lys Asn Gly Ile Thr Gly Pro
65 70 75 80

Cys Tyr Val Gly Lys Asp Thr His Ala Leu Ser Glu Pro Ala Phe Ile
85 90 95

Ser Val Leu Glu Val Leu Ala Ala Asn Gly Val Asp Val Ile Val Gln
100 105 110

Glu Asn Asn Gly Phe Thr Pro Thr Pro Ala Val Ser Asn Ala Ile Leu
115 120 125

Val His Asn Lys Lys Gly Gly Pro Leu Ala Asp Gly Ile Val Ile Thr
130 135 140

Pro Ser His Asn Pro Pro Glu Asp Gly Gly Ile Lys Tyr Asn Pro Pro
145 150 155 160

Asn Gly Gly Pro Ala Asp Thr Asn Val Thr Lys Val Val Glu Asp Arg
165 170 175

Ala Asn Ala Leu Leu Ala Asp Gly Leu Lys Gly Val Lys Arg Ile Ser
180 185 190

Leu Asp Glu Ala Met Ala Ser Gly His Val Lys Glu Gln Asp Leu Val
195 200 205

Gln Pro Phe Val Glu Gly Leu Ala Asp Ile Val Asp Met Ala Ala Ile
210 215 220

Gln Lys Ala Gly Leu Thr Leu Gly Val Asp Pro Leu Gly Gly Ser Gly
225 230 235 240

Ile Glu Tyr Trp Lys Arg Ile Gly Glu Tyr Tyr Asn Leu Asn Leu Thr
245 250 255

Ile Val Asn Asp Gln Val Asp Gln Thr Phe Arg Phe Met His Leu Asp
260 265 270

Lys Asp Gly Ala Ile Arg Met Asp Cys Ser Ser Glu Cys Ala Met Ala
275 280 285

Gly Leu Leu Ala Leu Arg Asp Lys Phe Asp Leu Ala Phe Ala Asn Asp
290 295 300

Pro Asp Tyr Asp Arg His Gly Ile Val Thr Pro Ala Gly Leu Met Asn
305 310 315 320

Pro Asn His Tyr Leu Ala Val Ala Ile Asn Tyr Leu Phe Gln His Arg
325 330 335

Pro Gln Trp Gly Lys Asp Val Ala Val Gly Lys Thr Leu Val Ser Ser
340 345 350

Ala Met Ile Asp Arg Val Val Asn Asp Leu Gly Arg Lys Leu Val Glu
355 360 365

Val Pro Val Gly Phe Lys Trp Phe Val Asp Gly Leu Phe Asp Gly Ser
370 375 380

Phe Gly Phe Gly Gly Glu Glu Ser Ala Gly Ala Ser Phe Leu Arg Phe
385 390 395 400

Asp Gly Thr Pro Trp Ser Thr Asp Lys Asp Gly Ile Ile Met Cys Leu
405 410 415

Leu Ala Ala Glu Ile Thr Ala Val Thr Gly Lys Asn Pro Gln Glu His
420 425 430

Tyr Asn Glu Leu Ala Lys Arg Phe Gly Ala Pro Ser Tyr Asn Arg Leu
435 440 445

Gln Ala Ala Ala Thr Ser Ala Gln Lys Ala Ala Leu Ser Lys Leu Ser
450 455 460

Pro Glu Met Val Ser Ala Ser Thr Leu Ala Gly Asp Pro Ile Thr Ala
465 470 475 480

Arg Leu Thr Ala Ala Pro Gly Asn Gly Ala Ser Ile Gly Gly Leu Lys
485 490 495

Val Met Thr Asp Asn Gly Trp Phe Ala Ala Arg Pro Ser Gly Thr Glu
500 505 510

Asp Ala Tyr Lys Ile Tyr Cys Glu Ser Phe Leu Gly Glu Glu His Arg
515 520 525

Lys Gln Ile Glu Lys Glu Ala Val Glu Ile Val Ser Glu Val Leu Lys
530 535 540

Asn Ala
545

<210> 9
<211> 558
<212> PRT
<213> Escherichia coli

<400> 9

Met Lys Leu Phe Lys Ser Ile Leu Leu Ile Ala Ala Cys His Ala Ala
1 5 10 15

Gln Ala Ser Ala Ala Ile Asp Ile Asn Ala Asp Pro Asn Leu Thr Gly
20 25 30

Ala Ala Pro Leu Thr Gly Ile Leu Asn Gly Gln Gln Ser Asp Thr Gln
35 40 45

Asn Met Ser Gly Phe Asp Asn Thr Pro Pro Pro Ser Pro Pro Val Val
50 55 60

Met Ser Arg Met Phe Gly Ala Gln Leu Phe Asn Gly Thr Ser Ala Asp
65 70 75 80

Ser Gly Ala Thr Val Gly Phe Asn Pro Asp Tyr Ile Leu Asn Pro Gly
85 90 95

Asp Ser Ile Gln Val Arg Leu Trp Gly Ala Phe Thr Phe Asp Gly Ala
100 105 110

Leu Gln Val Asp Pro Lys Gly Asn Ile Phe Leu Pro Asn Val Gly Pro
115 120 125

Val Lys Val Ala Gly Val Ser Asn Ser Gln Leu Asn Ala Leu Val Thr
130 135 140

Ser Lys Val Lys Glu Val Tyr Gln Ser Asn Val Asn Val Tyr Ala Ser
145 150 155 160

Leu Leu Gln Ala Gln Pro Val Lys Val Tyr Val Thr Gly Phe Val Arg
165 170 175

Asn Pro Gly Leu Tyr Gly Gly Val Thr Ser Asp Ser Leu Leu Asn Tyr
180 185 190

Leu Ile Lys Ala Gly Gly Val Asp Pro Glu Arg Gly Ser Tyr Val Asp
195 200 205

Ile Val Val Lys Arg Gly Asn Arg Val Arg Ser Asn Val Asn Leu Tyr
210 215 220

Asp Phe Leu Leu Asn Gly Lys Leu Gly Leu Ser Gln Phe Ala Asp Gly
225 230 235 240

Asp Thr Ile Ile Val Gly Pro Arg Gln His Thr Phe Ser Val Gln Gly
245 250 255

Asp Val Phe Asn Ser Tyr Asp Phe Glu Phe Arg Glu Ser Ser Ile Pro
260 265 270

Val Thr Glu Ala Leu Ser Trp Ala Arg Pro Lys Pro Gly Ala Thr His
275 280 285

Ile Thr Ile Met Arg Lys Gln Gly Leu Gln Lys Arg Ser Glu Tyr Tyr
290 295 300

Pro Ile Ser Ser Ala Pro Gly Arg Met Leu Gln Asn Gly Asp Thr Leu
305 310 315 320

Ile Val Ser Thr Asp Arg Tyr Ala Gly Thr Ile Gln Val Arg Val Glu
325 330 335

Gly Ala His Ser Gly Glu His Ala Met Val Leu Pro Tyr Gly Ser Thr
340 345 350

Met Arg Ala Val Leu Glu Lys Val Arg Pro Asn Ser Met Ser Gln Met
355 360 365

Asn Ala Val Gln Leu Tyr Arg Pro Ser Val Ala Gln Arg Gln Lys Glu
370 375 380

Met Leu Asn Leu Ser Leu Gln Lys Leu Glu Glu Ala Ser Leu Ser Ala
385 390 395 400

Gln Ser Ser Thr Lys Glu Glu Ala Ser Leu Arg Met Gln Glu Ala Gln
405 410 415

Leu Ile Ser Arg Phe Val Ala Lys Ala Arg Thr Val Val Pro Lys Gly
420 425 430

Glu Val Ile Leu Asn Glu Ser Asn Ile Asp Ser Val Leu Leu Glu Asp
435 440 445

Gly Asp Val Ile Asn Ile Pro Glu Lys Thr Ser Leu Val Met Val His
450 455 460

Gly Glu Val Leu Phe Pro Asn Ala Val Ser Trp Gln Lys Gly Met Thr
465 470 475 480

Thr Glu Asp Tyr Ile Glu Lys Cys Gly Gly Leu Thr Gln Lys Ser Gly
485 490 495

Asn Ala Arg Ile Ile Val Ile Arg Gln Asn Gly Ala Ala Val Asn Ala
500 505 510

Glu Asp Val Asp Ser Leu Lys Pro Gly Asp Glu Ile Met Val Leu Pro
515 520 525

Lys Tyr Glu Ser Lys Asn Ile Glu Val Thr Arg Gly Ile Ser Thr Ile
530 535 540

Leu Tyr Gln Leu Ala Val Gly Ala Lys Val Ile Leu Ser Leu
545 550 555

<210> 10
<211> 207
<212> PRT
<213> Escherichia coli

<400> 10

Met Ser Lys Lys Leu Ile Ile Phe Gly Ala Gly Gly Phe Ser Lys Ser
1 5 10 15

Ile Ile Asp Ser Leu Asn His Lys His Tyr Glu Leu Ile Gly Phe Ile
20 25 30

Asp Lys Tyr Lys Ser Gly Tyr His Gln Ser Tyr Pro Ile Leu Gly Asn
35 40 45

Asp Ile Ala Asp Ile Glu Asn Lys Asp Asn Tyr Tyr Tyr Phe Ile Gly
50 55 60

Ile Gly Lys Pro Ser Thr Arg Lys His Tyr Leu Asn Ile Ile Arg Lys
65 70 75 80

His Asn Leu Arg Leu Ile Asn Ile Ile Asp Lys Thr Ala Ile Leu Ser
85 90 95

Pro Asn Ile Ile Leu Gly Asp Gly Ile Phe Ile Gly Lys Met Cys Ile
100 105 110

Leu Asn Arg Asp Thr Arg Ile His Asp Ala Val Val Ile Asn Thr Arg
115 120 125

Ser Leu Ile Glu His Gly Asn Glu Ile Gly Cys Cys Ser Asn Ile Ser
130 135 140

Thr Asn Val Val Leu Asn Gly Asp Val Ser Val Gly Glu Glu Thr Phe
145 150 155 160

Val Gly Ser Val Thr Val Val Asn Gly Gln Leu Lys Leu Gly Ser Lys
165 170 175

Ser Ile Ile Gly Ser Gly Ser Val Val Ile Arg Asn Ile Pro Ser Asn
180 185 190

Val Val Val Ala Gly Thr Pro Thr Arg Leu Ile Arg Gly Asn Glu
195 200 205

<210> 11
<211> 191
<212> PRT
<213> Escherichia coli

<400> 11

Met Ala Lys Ser Val Pro Ala Ile Phe Leu Asp Arg Asp Gly Thr Ile

1	5	10	15
Asn Val Asp His Gly Tyr Val His Glu Ile Asp Asn Phe Glu Phe Ile			
	20	25	30
Asp Gly Val Ile Asp Ala Met Arg Glu Leu Lys Lys Met Gly Phe Ala			
35		40	45
Leu Val Val Val Thr Asn Gln Ser Gly Ile Ala Arg Gly Lys Phe Thr			
50		55	60
Glu Ala Gln Phe Glu Thr Leu Thr Glu Trp Met Asp Trp Ser Leu Ala			
65		70	75
Asp Arg Asp Val Asp Leu Asp Gly Ile Tyr Tyr Cys Pro His His Pro			
	85	90	95
Gln Gly Ser Val Glu Glu Phe Arg Gln Val Cys Asp Cys Arg Lys Pro			
	100	105	110
His Pro Gly Met Leu Leu Ser Ala Arg Asp Tyr Leu His Ile Asp Met			
	115	120	125
Ala Ala Ser Tyr Met Val Gly Asp Lys Leu Glu Asp Met Gln Ala Ala			
	130	135	140
Val Ala Ala Asn Val Gly Thr Lys Val Leu Val Arg Thr Gly Lys Pro			
145		150	155
Ile Thr Pro Glu Ala Glu Asn Ala Ala Asp Trp Val Leu Asn Ser Leu			
	165	170	175
Ala Asp Leu Pro Gln Ala Ile Lys Lys Gln Gln Lys Pro Ala Gln			
	180	185	190
<210> 12			
<211> 310			
<212> PRT			
<213> Escherichia coli			
<400> 12			
Met Ile Ile Val Thr Gly Gly Ala Gly Phe Ile Gly Ser Asn Ile Val			
1	5	10	15

Lys Ala Leu Asn Asp Lys Gly Ile Thr Asp Ile Leu Val Val Asp Asn
20 25 30

Leu Lys Asp Gly Thr Lys Phe Val Asn Leu Val Asp Leu Asn Ile Ala
35 40 45

Asp Tyr Met Asp Lys Glu Asp Phe Leu Ile Gln Ile Met Ala Gly Glu
50 55 60

Glu Phe Gly Asp Val Glu Ala Ile Phe His Glu Gly Ala Cys Ser Ser
65 70 75 80

Thr Thr Glu Trp Asp Gly Lys Tyr Met Met Asp Asn Asn Tyr Gln Tyr
85 90 95

Ser Lys Glu Leu Leu His Tyr Cys Leu Glu Arg Glu Ile Pro Phe Leu
100 105 110

Tyr Ala Ser Ser Ala Ala Thr Tyr Gly Gly Arg Thr Ser Asp Phe Ile
115 120 125

Glu Ser Arg Glu Tyr Glu Lys Pro Leu Asn Val Tyr Gly Tyr Ser Lys
130 135 140

Phe Leu Phe Asp Glu Tyr Val Arg Gln Ile Leu Pro Glu Ala Asn Ser
145 150 155 160

Gln Ile Val Gly Phe Arg Tyr Phe Asn Val Tyr Gly Pro Arg Glu Gly
165 170 175

His Lys Gly Ser Met Ala Ser Val Ala Phe His Leu Asn Thr Gln Leu
180 185 190

Asn Asn Gly Glu Ser Pro Lys Leu Phe Glu Gly Ser Glu Asn Phe Lys
195 200 205

Arg Asp Phe Val Tyr Val Gly Asp Val Ala Asp Val Asn Leu Trp Phe
210 215 220

Leu Glu Asn Gly Val Ser Gly Ile Phe Asn Leu Gly Thr Gly Arg Ala
225 230 235 240

Glu Ser Phe Gln Ala Val Ala Asp Ala Thr Leu Ala Tyr His Lys Lys
245 250 255

Gly Gln Ile Glu Tyr Ile Pro Phe Pro Asp Lys Leu Lys Gly Arg Tyr
260 265 270

Gln Ala Phe Thr Gln Ala Asp Leu Thr Asn Leu Arg Ala Ala Gly Tyr
275 280 285

Asp Lys Pro Phe Lys Thr Val Ala Glu Gly Val Thr Glu Tyr Met Ala
290 295 300

Trp Leu Asn Arg Asp Ala
305 310

<210> 13
<211> 477
<212> PRT
<213> Escherichia coli

<400> 13

Met Lys Val Thr Leu Pro Glu Phe Glu Arg Ala Gly Val Met Val Val
1 5 10 15

Gly Asp Val Met Leu Asp Arg Tyr Trp Tyr Gly Pro Thr Ser Arg Ile
20 25 30

Ser Pro Glu Ala Pro Val Pro Val Val Lys Val Asn Thr Ile Glu Glu
35 40 45

Arg Pro Gly Gly Ala Ala Asn Val Ala Met Asn Ile Ala Ser Leu Gly
50 55 60

Ala Asn Ala Arg Leu Val Gly Leu Thr Gly Ile Asp Asp Ala Ala Arg
65 70 75 80

Ala Leu Ser Lys Ser Leu Ala Asp Val Asn Val Lys Cys Asp Phe Val
85 90 95

Ser Val Pro Thr His Pro Thr Ile Thr Lys Leu Arg Val Leu Ser Arg
100 105 110

Asn Gln Gln Leu Ile Arg Leu Asp Phe Glu Glu Gly Phe Glu Gly Val

115					120					125					
Asp	Pro	Gln	Pro	Leu	His	Glu	Arg	Ile	Asn	Gln	Ala	Leu	Ser	Ser	Ile
130						135					140				
Gly	Ala	Leu	Val	Leu	Ser	Asp	Tyr	Ala	Lys	Gly	Ala	Leu	Ala	Ser	Val
145					150					155					160
Gln	Gln	Met	Ile	Gln	Leu	Ala	Arg	Lys	Ala	Gly	Val	Pro	Val	Leu	Ile
				165					170					175	
Asp	Pro	Lys	Gly	Thr	Asp	Phe	Glu	Arg	Tyr	Arg	Gly	Ala	Thr	Leu	Leu
			180					185					190		
Thr	Pro	Asn	Leu	Ser	Glu	Phe	Glu	Ala	Val	Val	Gly	Lys	Cys	Lys	Thr
	195						200					205			
Glu	Glu	Glu	Ile	Val	Glu	Arg	Gly	Met	Lys	Leu	Ile	Ala	Asp	Tyr	Glu
	210					215					220				
Leu	Ser	Ala	Leu	Leu	Val	Thr	Arg	Ser	Glu	Gln	Gly	Met	Ser	Leu	Leu
225					230					235					240
Gln	Pro	Gly	Lys	Ala	Pro	Leu	His	Met	Pro	Thr	Gln	Ala	Gln	Glu	Val
				245					250					255	
Tyr	Asp	Val	Thr	Gly	Ala	Gly	Asp	Thr	Val	Ile	Gly	Val	Leu	Ala	Ala
			260					265					270		
Thr	Leu	Ala	Ala	Gly	Asn	Ser	Leu	Glu	Glu	Ala	Cys	Phe	Phe	Ala	Asn
	275						280					285			
Ala	Ala	Ala	Gly	Val	Val	Val	Gly	Lys	Leu	Gly	Thr	Ser	Thr	Val	Ser
	290					295					300				
Pro	Ile	Glu	Leu	Glu	Asn	Ala	Val	Arg	Gly	Arg	Ala	Asp	Thr	Gly	Phe
305					310					315					320
Gly	Val	Met	Thr	Glu	Glu	Glu	Leu	Lys	Leu	Ala	Val	Ala	Ala	Ala	Arg
				325					330					335	
Lys	Arg	Gly	Glu	Lys	Val	Val	Met	Thr	Asn	Gly	Val	Phe	Asp	Ile	Leu

340

345

350

His Ala Gly His Val Ser Tyr Leu Ala Asn Ala Arg Lys Leu Gly Asp
 355 360 365

Arg Leu Ile Val Ala Val Asn Ser Asp Ala Ser Thr Lys Arg Leu Lys
 370 375 380

Gly Asp Ser Arg Pro Val Asn Pro Leu Glu Gln Arg Met Ile Val Leu
 385 390 395 400

Gly Ala Leu Glu Ala Val Asp Trp Val Val Ser Phe Glu Glu Asp Thr
 405 410 415

Pro Gln Arg Leu Ile Ala Gly Ile Leu Pro Asp Leu Leu Val Lys Gly
 420 425 430

Gly Asp Tyr Lys Pro Glu Glu Ile Ala Gly Ser Lys Glu Val Trp Ala
 435 440 445

Asn Gly Gly Glu Val Leu Val Leu Asn Phe Glu Asp Gly Cys Ser Thr
 450 455 460

Thr Asn Ile Ile Lys Lys Ile Gln Gln Asp Lys Lys Gly
 465 470 475

<210> 14
 <211> 420
 <212> PRT
 <213> Escherichia coli

<400> 14

Met Leu Lys Arg Leu Gly Lys Val Phe Gly Pro Leu Val Cys Ala Leu
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Leu Leu Leu Val Gly Leu Tyr Leu Val Phe Pro Val Ser Gln Pro His
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His Leu Gly Lys Glu Lys Asn Ser Ala Val Ala Leu Thr Lys Ala Gly
 35 40 45

Phe Lys Ser Arg Val Gln Lys Val Arg Ala Phe Ser Asp Pro Lys Ala
 50 55 60

Asn Phe Val Pro Phe Phe Gly Ser Ser Glu Trp Leu Arg Phe Asp Ala
65 70 75 80

Met His Pro Ser Val Leu Ala Glu Ala Tyr Lys Arg Pro Tyr Ile Pro
85 90 95

Tyr Leu Leu Gly Gln Lys Gly Ala Ala Ser Leu Thr Gln Tyr Tyr Gly
100 105 110

Ile Gln Gln Ile Lys Gly Gln Ile Lys Asn Lys Lys Ala Ile Tyr Val
115 120 125

Ile Ser Pro Gln Trp Phe Val Arg Lys Gly Ala Asn Lys Gly Ala Phe
130 135 140

Gln Asn Tyr Phe Ser Asn Asp Gln Thr Ile Arg Phe Leu Gln Asn Gln
145 150 155 160

Thr Gly Thr Thr Tyr Asp Arg Tyr Ala Ala Arg Arg Leu Leu Lys Leu
165 170 175

Tyr Pro Glu Ala Ser Met Ser Asp Leu Ile Glu Lys Val Ala Asp Gly
180 185 190

Gln Lys Leu Ser Asn Lys Asp Lys Gln Arg Leu Lys Phe Asn Asp Trp
195 200 205

Val Phe Glu Lys Thr Asp Ala Ile Phe Ser Tyr Leu Pro Leu Gly Lys
210 215 220

Thr Tyr Asn Gln Val Ile Met Pro His Val Gly Lys Leu Pro Lys Ala
225 230 235 240

Phe Ser Tyr Asn His Leu Ser Arg Ile Ala Ser Gln Asp Ala Lys Val
245 250 255

Ala Thr Arg Ser Asn Gln Phe Gly Ile Asp Asp Arg Phe Tyr Gln Thr
260 265 270

Arg Ile Lys Lys His Leu Lys Lys Leu Lys Gly Ser Gln Arg His Phe
275 280 285

Asn Tyr Thr Lys Ser Pro Glu Phe Asn Asp Leu Gln Leu Val Leu Asn
290 295 300

Glu Phe Ser Lys Gln Asn Thr Asp Val Leu Phe Val Ile Pro Pro Val
305 310 315 320

Asn Lys Lys Trp Thr Asp Tyr Thr Gly Leu Asp Gln Lys Met Tyr Gln
325 330 335

Lys Ser Val Glu Lys Ile Lys His Gln Leu Gln Ser Gln Gly Phe Asn
340 345 350

His Ile Ser Asp Leu Ser Arg Asp Gly Gly Lys Pro Tyr Phe Met Gln
355 360 365

Asp Thr Ile His Leu Gly Trp Asn Gly Trp Leu Glu Leu Asp Lys His
370 375 380

Ile Asn Pro Phe Leu Thr Glu Glu Asn Ser Lys Pro Asn Tyr His Ile
385 390 395 400

Asn Asn Lys Phe Leu Lys Arg Ser Trp Ala Lys Tyr Thr Gly Arg Pro
405 410 415

Ser Asp Tyr Lys
420

<210> 15
<211> 511
<212> PRT
<213> Escherichia coli

<400> 15

Met Ile His Asp Met Ile Lys Thr Ile Glu His Phe Ala Glu Thr Gln
1 5 10 15

Ala Asp Phe Pro Val Tyr Asp Ile Leu Gly Glu Val His Thr Tyr Gly
20 25 30

Gln Leu Lys Val Asp Ser Asp Ser Leu Ala Ala His Ile Asp Ser Leu
35 40 45

Gly Leu Val Glu Lys Ser Pro Val Leu Val Phe Gly Gly Gln Glu Tyr
50 55 60

Glu Met Leu Ala Thr Phe Val Ala Leu Thr Lys Ser Gly His Ala Tyr
65 70 75 80

Ile Pro Val Asp Gln His Ser Ala Leu Asp Arg Ile Gln Ala Ile Met
85 90 95

Thr Val Ala Gln Pro Ser Leu Ile Ile Ser Ile Gly Glu Phe Pro Leu
100 105 110

Glu Val Asp Asn Val Pro Ile Leu Asp Val Ser Gln Val Ser Ala Ile
115 120 125

Phe Glu Glu Lys Thr Pro Tyr Glu Val Thr His Ser Val Lys Gly Asp
130 135 140

Asp Asn Tyr Tyr Ile Ile Phe Thr Ser Gly Thr Thr Gly Leu Pro Lys
145 150 155 160

Gly Val Gln Ile Ser His Asp Asn Leu Leu Ser Phe Thr Asn Trp Met
165 170 175

Ile Ser Asp Asp Glu Phe Ser Val Pro Glu Arg Pro Gln Met Leu Ala
180 185 190

Gln Pro Pro Tyr Ser Phe Asp Leu Ser Val Met Tyr Trp Ala Pro Thr
195 200 205

Leu Ala Met Gly Gly Thr Leu Phe Ala Leu Pro Lys Thr Val Val Asn
210 215 220

Asp Phe Lys Lys Leu Phe Ala Thr Ile Asn Glu Leu Pro Ile Gln Val
225 230 235 240

Trp Thr Ser Thr Pro Ser Phe Ala Asp Met Ala Leu Leu Ser Asn Asp
245 250 255

Phe Asn Ser Glu Thr Leu Pro Gln Leu Thr His Phe Tyr Phe Asp Gly
260 265 270

Glu Glu Leu Thr Val Lys Thr Ala Gln Lys Leu Arg Gln Arg Phe Pro
275 280 285

Lys Ala Arg Ile Val Asn Ala Tyr Gly Pro Thr Glu Ala Thr Val Ala
290 295 300

Leu Ser Ala Val Ala Ile Thr Asp Glu Met Leu Glu Thr Cys Lys Arg
305 310 315 320

Leu Pro Ile Gly Tyr Thr Lys Asp Asp Ser Pro Thr Tyr Val Ile Asp
325 330 335

Glu Glu Gly His Lys Leu Pro Asn Gly Glu Gln Gly Glu Ile Ile Ile
340 345 350

Ala Gly Pro Ala Val Ser Lys Gly Tyr Leu Asn Asn Pro Glu Lys Thr
355 360 365

Ala Glu Ala Phe Phe Gln Phe Glu Gly Leu Pro Ala Tyr His Thr Gly
370 375 380

Asp Leu Gly Ser Met Thr Asp Glu Gly Leu Leu Leu Tyr Gly Gly Arg
385 390 395 400

Met Asp Phe Gln Ile Lys Phe Asn Gly Tyr Arg Ile Glu Leu Glu Asp
405 410 415

Val Ser Gln Asn Leu Asn Lys Ser Gln Tyr Val Lys Ser Ala Val Ala
420 425 430

Val Pro Arg Tyr Asn Lys Asp His Lys Val Gln Asn Leu Leu Ala Tyr
435 440 445

Ile Val Leu Lys Glu Gly Val Arg Asp Asp Phe Glu Arg Asp Leu Asp
450 455 460

Leu Thr Lys Ala Ile Lys Glu Asp Leu Lys Asp Ile Met Met Asp Tyr
465 470 475 480

Met Met Pro Ser Lys Phe Ile Tyr Arg Glu Asp Leu Pro Leu Thr Pro
485 490 495

Asn Gly Lys Ile Asp Ile Lys Gly Leu Met Ser Glu Val Asn Lys
500 505 510

<210> 16
 <211> 919
 <212> DNA
 <213> Escherichia coli

<400> 16

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agaaggggttc gcacagattc cttcctggca cgctgccgtt gagcgagtta ttcctgtggc	120
aatacgtcgc tggcgtaaag cctggttctc ggccccata aaagctgaac gcaaagcggt	180
tcgtgaagcg ctacaagcag agaactatga cgcagttatc gacgctcagg ggctggtaaa	240
aagcgcggca ctggtgacac gtctggcgca tggcgtaaag catggattgg actggcaaac	300
cgctcgcgaa ccttttagcca gcctgtttta caattgtaag catcatattg caaaacagca	360
gcacgccgta gaacgcaccc gcgaactgtt tgccaaaagt ttgggctata gcaaaccgca	420
aaccaggggc gattatgcta tcgcacagca ttttctgacg aacctgccta cagatgctgg	480
cgaatatgcc gtatttcttc atgcgacgac ccgtgatgat aaacactggc cggaagaaca	540
ctggcgagaa ttgattggtt tactggctga ttcaggaata cggattaaac ttccgtgggg	600
cgcgccgcat gaggaagaac gggcgaaacg actggcggaa ggatttgctt atgttgaagt	660
attgccgaag atgagtctgg aaggcgttgc ccgctgctg gccggggcta aatttgtagt	720
gtcggtggtat acgggggttaa gccatttaac ggcggcactg gatagacca atatcacggt	780
ttatggacca accgatccgg gattaattgg tgggtatggg aagaatcaga tggttttag	840
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aaacgctgcc atgatttaa	919

<210> 17
 <211> 1023
 <212> DNA
 <213> Escherichia coli

<400> 17

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aatccagaga ttaacgcgct ctacggcata aaaaataaaa aagcaaaagc ctcagaaaaa	180
attgccaact tttttcatct catcaaggta ttacgtgccataaagtatga cttatcgtc	240
aatctcaccg atcaatggat ggttgctata ctggttcgct tattaaatgc ccgtgtgaaa	300

atttcccagg attatcatca tcggcagtct gctttttggc gtaaaagttt caccatttg	360
gtgccgttgc aggggtggaaa tgtggtggaa agtaacttat ccgtgctgac cccattggga	420
gttgattcgt tgggtgaagca gacaaccatg agttaccgcg ctgcaagctg gaaacgatg	480
cgtcgcgaac ttgatcacgc tgggtgttga caaaattatg tggttatcca acctacggcg	540
cggcaaattct tcaaagtctg ggacaacgcc aagttttccg ctgtgattga tgccttacat	600
gctcgtgggt atgaagttgt tctgacgtcc ggcccagata aagacgatct ggctgcgtc	660
aatgaaattg cgcagggatg ccagacgcca ccagtaacgg cgctggctgg aaaggtgacc	720
ttcccggAAC ttggtgcgtt aatcgatcat gcgcagctgt ttattggcgt tgattccgca	780
ccggcgcata ttgccgtgc agttaatacg ccgctgatat cgctgtttgg tgcgacagac	840
catattttct ggcgtccctg gtcaaataac atgattcaat tctggggcggg agattaccgg	900
gaaatgccaa cgcgcgatca gcgtgaccga aatgagatgt atctttcggg tattccggcg	960
gcagatgtca ttgctgctgt cgataaatta ctgccctcct ccacgacagg tacgtcggtta	1020
tga	1023

<210> 18
 <211> 798
 <212> DNA
 <213> *Escherichia coli*

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gaaatggcgg gcaaaagcta ttttctcaaa tggcatcgcg gcacgaccct gaaagagata	180
atcaaaaatt tactctcatt gcggatgcca gtattaggcg ctgaccgca atggaatgcg	240
attcatcgac tgcgggatgt cggcgttgat actatgtatg ggggtggcatt tggcgaaaaa	300
ggcatgaatc cgctgaccag aacttcattt attattaccg aagatctgac accaaccata	360
agtctggaag attactgtgc tgactgggcg actaaccctc cagatgttcg cgtaaagcgt	420
atgcttatta agcgtgtcgc gacgatgggt gcgcgatatgc atgctgcggg cattaaccac	480
cgtgactgtt atatctgtca tttcctgctg cacttgccct tttccggtaa ggaagaggag	540
ttaaaaattt cggtaattga cctgcaccgg gcgcagcttc gcacgcgcgt tccacgtcgt	600
tggcgggata aagatcttat tgggctttat ttttcttcga tgaatatcgg cctgactcag	660

cgggatatct ggcgggtttat gaaagtgtat tttgccgccc cgcttaaaga cattctcaag	720
caggaacaag gactgctgtc gcaagcagaa gcaaaagcca caaaaatcag ggaaagaacg	780
attcgaaaat cgttgtaa	798

<210> 19
 <211> 1125
 <212> DNA
 <213> Escherichia coli

<400> 19	
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atgcgtattg ctgagacagt cgccgcccga ggtcatcatg ttcgggttta taccagtcg	120
tgggaaggcg aatgccctga tgtatttgaa ctgatcaaag tgccggttaa atcgcatacc	180
aatcacgggc gcaatgcgga gtattttgcc tgggtgcaaa aacatttacg cgaacatccc	240
gtcgataaag tcgttggtt caacaaaatg ccggggctgg acgtttatta tgccgctgat	300
gtttgttatg ccgagaaagt agcgcaggaa aaaggctttt tctatcgctt gacgtcacgt	360
tatcgccatt atgccgcctt tgagcgggca accttcgaac agggcaagcc gacacagctg	420
ctgatgctga cagataagca aatcgccgat ttccagaaac attatcagac tgaagcggag	480
cgttttcata ttctgccacc ggggatttat cctgatcgta aatatagcca gcagccagcc	540
aatagccgtg aaatcttccg taagaagaat ggaataaccg aacaacaata tttattgttg	600
caggtcggtt cagacttcac gcgtaaaggt gtcgatcggt ccattgaagc acttgcttcg	660
ttaccggatt cgctgcgcca caacacattg ctatatgttg ttgggcagga taaaccgcca	720
aaatttgagg cactggcaga aaaacgcggc gtgcgcagta atgttcactt cttctcgggg	780
cgcaacgatg tctcggaatt aatggcggcg gcggatttat tactgcatcc tgcctaccag	840
gaagcggcgg gaattgtgct gctggaagcg attactgcag gattaccggt actaacaact	900
gccgtttgtg gctatgcgca ttatatgtc gacgctaatt gcggcgaggc tattgctgag	960
ccattccgcc aggaacatt gaatgagatt ttacgcaaag cgttaacgca atcttcattg	1020
cgccaggctt gggcggaata tgccgcacat tatgctgata cacaagattt atacagtctg	1080
ccagagaaag cggcggatat cataacgggt ggtctggatg gttga	1125

<210> 20
 <211> 1047
 <212> DNA
 <213> Escherichia coli

<400> 20

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tatcgcacgc tccaggcgcg ctatccccag gcgataatcg atgtgatggc accggcatgg    120

tgccgtccat tattatcgcg gatgccggaa gttaacgaag ctattcctat gcctctcggg    180
cacggagcgc tggaaatcgg cgaacgccgc aaactgggtc atagcctgcg tgaaaagcgc    240
tacgaccgcg cctacgtctt acccaactcc ttcaaactcg cattagtgcc tttcttcgcg    300
ggtattcctc atcgcacccg ctggcgcggc gagatgcgct acggtttact caacgatgta    360
cgcggtgctc ataaagaagc ctggccgcta atgggtggaac gctatatagc gctggcctat    420
gacaaaggca ttatgcgcac agcacaagat ctgccgcagc cattgttatg gccgcagttg    480
caggtgagcg aaggtgaaaa atcatatacc tgtaatcaat tttcgctttc atcagaacgt    540
ccgatgattg gtttttgccc ggggtgcggag tttgggtccg caaaacgctg gccacactac    600
cactatgcgg agctggcaaa gcagctgatt gatgaagggt atcaggtggg tctgtttggc    660
tcggcgaaag atcatgaagc gggcaatgag attcttgccg ctttgaatac cgagcagcag    720
gcatggtgtc ggaacctggc gggggaaaca cagcttgatc aagcggttat cctgattgca    780
gcctgtaaag ccattgtcac taacgattct ggcctgatgc atgttgccgc ggcgctcaat    840
cgtccgctgg ttgccctgta tgggtccgagt agcccggact tcacaccgcc gctatcccat    900
aaagcgcgcg tgatccgttt gattaccggc tatcacaaag tgcgtaaagg tgacgctgcg    960
gagggttatc accagagctt aatcgacatt actccccagc gcgtactgga agaactcaac   1020
gcgctattgt tacaagagga agcctga                                     1047
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<210> 21

<211> 1017

<212> DNA

<213> Escherichia coli

<400> 21

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ctttttgggt gtgggtgtttc aatcacgtca gttttgttac ataacaacga cgtgagtttt    180
gttttccacg tttttattga tgatatccct gaagccgata tccagcgttt agcccaattg    240
gcgaaaagct atcgtaacct tatccagatc catctagtaa attgtgaacg gcttaaggca    300
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ttaccgacga ccaaaaattg gtctattgcc atgtatttcc gttttgtaat tgcagattac	360
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ttaaagccgc tgataacaat ggatcttgcc aataacgttg ctgctgttgt tactgaacgc	480
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tactttaatt caggtgtcct gttaattaat acactagcgt gggcgagga gtccgtttct	600
gctaaagcga tgtcgatgct tgctgataaa gccatcggtt cccgtttaac ctatatggat	660
caagatatcc ttaatcttat cctgttaggg aaagttaa	720
acgcaattta gtttaaatta tgaattaaaa aaatcatttg tttgtccaat taatgatgaa	780
accgtattaa ttcattatgt cggcccgaca aaaccctggc attactgggc cggttatcca	840
agtgcgcaac cttttatcaa agccaaagaa gcatcgccct ggaaaaatga accgttaatg	900
cggccagtta actcaaaacta tgctcgttat tgcgccaagc ataattttaa acaaaacaaa	960
ccaattaacg ggataatgaa ttatatattt tattttttatt taaagataat aaaatga	1017

<210> 22
 <211> 909
 <212> DNA
 <213> Escherichia coli

<400> 22

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ttaattcaat acgtcgtgaa tgaatgtatt gcggtctggc ttactgaaat tgtgctgggt	180
acacactcat ctaaaaactc tattgaaaac cactttgata ccagttttga actggaagca	240
atgctggaaa aacgtgtaaa acgtcaactg cttgatgaag tgcagtctat ttgtccaccg	300
cacgtgacta ttatgcaagt tcgtcagggc ctggcgaaag gcctgggaca cgcggtattg	360
tgtgctcacc cggtagtggg tgatgaaccg gtagctgtta ttttgctga tgttattctg	420
gatgaatatg aatccgattt gtcacaggat aacctggcag agatgatccg ccgctttgat	480
gaaacgggtc atagccagat catggttgaa ccggttgctg atgtgaccgc atatggcggt	540
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gaaaaaccga aagcggatgt tgcgccgtct aatctcgcta ttgtgggtcg ttacgtactt	660
agcgcggtata tttggccgtt gctggcaaaa acccctccgg gagctgggtga tgaaattcag	720

ctcaccgacg caattgatat gctgatcgaa aaagaaacgg tggaagccta tcatatgaaa	780
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aagaagtaa	909

<210> 23
 <211> 1641
 <212> DNA
 <213> Escherichia coli

<400> 23	
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aaattcggta cttccgggtca ccgtggcagt gcagcgcgcc acagctttaa cgagccgcac	180
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gtgctggcag cgaacggcgt tgatgtcatt gtgcaggaaa acaatggctt caccgccgacg	360
cctgccgttt ccaatgccat cctgggtcac aataaaaaag gtggcccgtc ggcagacggg	420
atcgtgatta caccgtccca taaccgccg gaagatgggtg gaatcaaata caatccgcc	480
aatgggtggc cggtgatac caacgtcact aaagtgggtg aagacagggc caacgcactg	540
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atcgaatact ggaagcgtat tggcgagtat tacaacctca acctgactat cgttaacgat	780
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cgcctgactg	ctgctccggg	caacggtgct	tctattggcg	gtctgaaagt	gatgactgac	1500
aacggctggt	tcgccgcg	tccgtcaggc	acggaagacg	catataagat	ctactgcgaa	1560
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gaagttctga	aaaacgcgta	a				1641

<210> 24
 <211> 1677
 <212> DNA
 <213> Escherichia coli

<400> 24

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gccattgata	ttaacgctga	cccaaacttt	acaggagccg	cgccgcttac	cggatattctg	120
aacgggcaac	agtcggatac	gcaaaacatg	agcggcttcg	acaatacccc	gccgccttca	180
ccgccggtgg	taatgagccg	tatgttttgt	gctcaacttt	tcaacggcac	cagcgcggat	240
agcggtgcca	cggtaggatt	caaccctgac	tatattctga	atccgggtga	tagcattcag	300
gttcgcttgt	gggggtgcgtt	cacctttgat	ggtgcgttac	aggttgatcc	caaaggtaat	360
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gccctggtca	catccaaagt	gaaggaagta	taccagtcca	acgtcaacgt	ctacgcctcc	480
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ccagagcgcg	gaagttacgt	tgatattgtg	gtcaagcgcg	gtaaccgctg	gcgctccaac	660
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ggcgatgaga ttatggttct gccgaaatat gaatcgaaaa acattgaagt taccctggtt	1620
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<210> 25
 <211> 624
 <212> DNA
 <213> Escherichia coli

<400> 25	
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caatcatatc caatattagg taatgatatt gcagacatcg agaataagga taattattat	180
tattttattg ggataggcaa accatcaact aggaagcact atttaaacad cataagaaaa	240
cataatctac gcttaattaa cattatagat aaaactgcta ttctatcacc aaatattata	300
ctgggtgatg gaatttttat tggtaaaatg tgtatactta accgtgatac tagaatacat	360
gatgccgttg taataaatac taggagttta attgaacatg gtaatgaaat aggctgctgt	420
agcaatatct ctactaatgt tgtacttaat ggtgatgttt ctgttggaga agaaactttt	480
gttggttagcg tgactgttgt aaatggccag ttgaagctag gctcaaagag tattattggt	540
tctgggtcgg ttgtaattag aaatatacca agtaatgttg tagttgctgg gactccaaca	600
agattaatta gggggaatga atga	624

<210> 26
 <211> 576

<212> DNA

<213> Escherichia coli

<400> 26

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cgcgattatt tgcattattga tatggccgct tcttatatgg tgggcgataa attagaagat	420
atgcaggcag cggttgcggc gaacgtggga acaaaagtgc tgggtgcgtac gggtaaact	480
attacacctg aagcagaaaa cgcggcagat tgggtgttaa atagcctggc agacctgccg	540
caagcgataa aaaagcagca aaaaccggcg caatga	576

<210> 27

<211> 933

<212> DNA

<213> Escherichia coli

<400> 27

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aacctggtgg atctgaatat cgcagactat atggataagg aagacttcct gatccagatt	180
atggctggcg aagagttcgg cgatgtcgaa gcgattttcc acgaaggcgc gtgctcttcc	240
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ctgcactact gcctggagcg tgaaatcccc ttctgtacg cttcttcgc agccacctac	360
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gaatccttcc aggctgtagc tgatgctacg ctggcttatac acaagaaagg ccagatcgaa	780
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<210> 28
 <211> 1434
 <212> DNA
 <213> Escherichia coli

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ctggatcggtt actggtacgg cccaccagt cgtatctcgc cggaagcgcc ggtgcccgtg	120
gttaaagtga ataccatcga agaacgtccg ggcggcgcgg ctaacgtggc gatgaatatac	180
gcttctctcg gtgctaatac acgcctgggc ggggtgacgg gcattgacga tgcagcgcg	240
gcgctgagta aatctctggc cgacgtcaac gtcaaatgcg acttcgtttc tgtaccgacg	300
catccgacca ttaccaaatt acgggtactt tcccgaacc aacagctgat ccgtctggat	360
tttgaagaag gtttcgaagg tgttgatccg cagccgctgc acgagcggat taatcaggcg	420
ctgagttcga ttggcgcgct ggtgctttct gactacgcca aaggtgcgct ggcaagcgta	480
cagcagatga tccaactggc gcgtaaagcg ggtgttccgg tgctgattga tccaaaaggt	540
accgattttg agcgctaccg cggcgctacg ctgttaacgc cgaatctctc ggaatttgaa	600
gctgtttgctg gtaaattgaa gaccgaagaa gagattgttg agcgcgccat gaaactgatt	660
gccgattacg aactctcggc tctgttagtg acccgttccg aacagggtat gtcgctgctg	720
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gcaaatgccc gcaagctggg tgaccgcttg attgttgccg tcaacagcga tgcctccacc	1140
aaacggctga aaggggattc ccgcccggta aaccactcg aacagcgat gattgtgctg	1200

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atcgccggga tcttgccaga tctgctgggtg aaaggcggcg actataaacc agaagagatt	1320
gccgggagta aagaagtctg ggccaacggt ggcgaagtgt tggtgctcaa ctttgaagac	1380
ggttgctcga cgaccaacat catcaagaag atccaacagg ataaaaaagg ctaa	1434

<210> 29
 <211> 1263
 <212> DNA
 <213> Escherichia coli

<400> 29	
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ggattatata ttgtttttcc tgtttctcag cctcatcatt taggtaagga aaaaaacagt	120
gcagtagcgt tgacaaaggc aggtttttaa agcagagttc aaaaagttag agctttcagt	180
gatcctaaag ccaattttgt ccctttcttt ggttcaagtg agtgggtaag atttgatgca	240
atgcatccat cagtttttagc agaggcttac aaaaggcctt atatcccata tcttttaggt	300
caaaaagggg cggtttctct gacacaatac tatggcattc aacagattaa aggacaaatc	360
aaaaataaaa aagctatcta tgttatttct ccgcaatggg ttgttcgcaa gggagccaac	420
aaaggtgctt ttcaaaacta tttcagcaac gatcaaacca ttcgattttt gcaaaatcaa	480
acagggacaa cctacgatag gtatgctgct cgtcgattgt taaaattata tcctgaagct	540
tctatgtcag atttgataga aaaagttgca gatggccaaa aactatcaaa taaagacaaa	600
caaagactaa agtttaatga ttgggtattt gagaagacag atgctatttt tagctatcta	660
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ggaggtaagc catactttat gcaagataca atccatttag gttggaatgg ttggttagag	1140
ctagataagc atatcaatcc atttttaaca gaggaaaaca gcaagccaaa ttatcacatt	1200
aataataaat ttttgaagag atcttgggca aaatatacag gacgtccaag tgattacaag	1260

taa

1263

<210> 30
<211> 1536
<212> DNA
<213> Escherichia coli

<400> 30

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ctagctgctc	atattgatag	cctaggcctt	gttgaaaaat	cacctgtctt	agtattcggt	180
ggccaagaat	atgaaatggt	ggcgacatct	gttgctttta	caaagtcagg	gcatgcttat	240
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ccaagcctta	tcatttcaat	tggtgaatct	cctcttgaag	ttgataatgt	cccaatccta	360
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gttaaagggtg	atgataatta	ctatattatt	ttcacttcag	ggactactgg	tttaccaaaa	480
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cgtgatttgg atttgacaaa agcaattaag gaagacttaa aggacattat gatggattac 1440

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gatatcaaag gtcttatgag cgaggtaaac aagtga 1536

<210> 31

<211> 60

<212> DNA

<213> Escherichia coli

<400> 31

tcgtgcaggc caacctgcac aacagagtga ttgattaac gtgtaggctg gagctgcttc 60

<210> 32

<211> 60

<212> DNA

<213> Escherichia coli

<400> 32

cagggtgctg gcgctcacca tttccggaga cagcttagac acatatgaat atcctcctta 60